MSC Guidelines for Review of Cargo Gauging/Overfill Protection

Procedure Number: E2-11 Revision Date: 01/28/00

References

a. Title 46 CFR 39.20-3, Cargo Gauging System

b. Title 46 CFR 39.20-7, Tankship Liquid Overfill Protection

c. Title 46 CFR 39.20-9, Tank Barge Liquid Overfill Protection

d. Title 46 CFR 151.15-10, Cargo Gauging Devices

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These guidelines were developed by the Marine Safety Center staff as an aid in the preparation and review of vessel plans and submissions. They were developed to supplement existing guidance. They are not intended to substitute or replace laws, regulations, or other official Coast Guard policy documents. The responsibility to demonstrate compliance with all applicable laws and regulations still rests with the plan submitter. The Coast Guard and the U. S. Department of Transportation expressly disclaim liability resulting from the use of this document.

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Cargo Gauging Systems:

- Ensure that use of the system does not require exposing the tank to the atmosphere during cargo transfer.
- Ensure the system allows the operator to determine the liquid level in the tank for the full range of liquid levels in the tank.
- Ensure the tank's liquid level indicator is located where the cargo transfer is controlled.

- Ensure that tank barges equipped with cargo gauging systems have a liquid overfill protection alarm that meets the following requirements (compliance with 46 CFR 39.20-9(a) is also acceptable):
    a. Provides a visual indication of the liquid level in the cargo tank when the level is within 1.0 meter (3.28 feet) of the tank top;
    b. Has the maximum liquid level permitted by 46 CFR 39.30-1(e) permanently marked on the indicating device; and
    c. Is visible from all cargo control areas on the tank barge.

- Verify that the components and layout of the closed system meet the arrangement requirements specified in 46 CFR 151.15-10.

<u>Tankship Liquid Overfill Protection:</u>

- Ensure that the high level alarm and tank overfill alarm are intrinsically safe.

- For systems installed after July 23, 1990, ensure that:
    a. The high level alarm and tank overfill alarm are independent of one another;
    b. They are capable of sounding an alarm in the event of loss of power to the system or failure of electrical circuitry to the system sensors; and
    c. The alarm circuitry and sensors can be checked locally at the tank for proper operation, prior to each transfer, either manually or by an electronic self-testing feature.

- Ensure that the high level alarm:
    a. Sounds before the tank overfill alarm but not before the tank is at 95 percent capacity;
    b. Is identified with the legend "High Level Alarm" in black letters at least 2 inches high; and
    c. Has audible and visible alarm indications that can be seen and heard on the vessel where the cargo transfer is controlled.

- Ensure that the tank overfill alarm:
    a. Is independent of the Cargo Gauging System.
    b. Sounds early enough to allow transfer personnel to stop transfer operations before the tank overflows;
    b. Is identified with the legend "Tank Overfill Alarm" in black letters at least 2 inches high; and
    c. Has audible and visible alarm indications that can be seen and heard on the vessel where the cargo transfer is controlled.

- If equipped with a spill valve, ensure it meets the requirements of 46 CFR 39.20-9(c).

- If equipped with a rupture disk, ensure it meets the requirements of 46 CFR 39.20-9(d).

Tank Barge Liquid Overfill Protection:

? Ensure that the tank barge has a liquid overfill protection system that meets one of the following arrangements:

a. A system that complies with 46 CFR 39.20-7 but includes: (1) a self-contained power supply and (2) is either powered by generators installed on the barge or shore power which is fitted with a 120 volt 20 amp explosion-proof plug.
b. An intrinsically safe system which: (1) is independent of the cargo gauging system, (2) actuates an alarm and automatic shutdown system at the facility overfill control panel 60 seconds before the tank become 100 percent liquid filled, (3) can be checked at the tank for proper operation, (4) has all tank overfill sensors connected in series and (5) has a male plug meeting the requirements of 46 CFR 39.20-9(b)(8).
c. Utilizes a spill valve arrangement which limits the maximum pressure at the cargo tank top during liquid overfill, at the maximum loading rate for the tank, to not more than the maximum design working pressure for the tank.
d. Uses a rupture disk arrangement which meets the requirements of 46 CFR 39.20-9(d) and is approved by Commandant (G-MSO).

- If using arrangement (a) above, ensure that the explosion proof plug meets the requirements of 46 CFR 39-20-9(a)(1)(i)-(iii).

- If using arrangement (b) above, ensure that the system has at least one tank overfill sensor switch per tank with normally closed contacts.

- If using arrangement (c) above ensure that vessels in ocean or coastwise service have provisions to prevent opening due to cargo sloshing.

- For tank barge systems utilizing the intrinsically safe system outlined in arrangement (b) above, ensure that the system consists of components which, individually or in series, will not generate or store a total of more than 1.2 V, 0.1 A, 25mW, or 20 microjoules.

- For tank barge systems using the spill valve arrangement outlined in arrangement (c) above, ensure the spill valve relieves at a pressure higher than the pressure required by 46 CFR 39.20-11.

Applicable to All Systems:

- Ensure that all systems meet the wiring and cabling requirements of 46 CFR Subchapter J. For tank barge installations utilizing the intrinsically safe system outlined in arrangement (b) above, ensure the sensor interconnecting cabling meets 46 CFR 111.105-15(b).

Attachments

None